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EXAMINER

DO, CHAT C

ART UNIT

PAPER NUMBER

2124

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/776,080

Applicant(s)

HSU ET AL.

Examiner

Chat C. Do

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 2/1/01; 6/11/01.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 13-15 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 16-17 is/are rejected.
- 7) ☒ Claim(s) 6-10 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Information Disclosure Statement***

1. The information disclosure statement filed 6/11/2001 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the information disclosure statement does not recite any author for all references and publisher for some references. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

***Claim Objections***

2. Claims 1, 11, and 16-17 are objected to because of the following informalities:

The acronym "SIMD" in line 2 of claim 1 should be replaced with "single-instruction multiple-data (SIMD)". Claims 11 and 16-17 have the same problem. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 2124

4. Claims 2, 3, 7, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 2, the limitation "the pi2fw instruction" in lines 1-2 lacks an antecedence basis. For examination purposes, the examiner considers this limitation "a pi2fw instruction" as a parallel integer to floating-point word instruction.

Re claim 3, the limitation "the pswap, pfmul, and pfpnacc instructions" in line 2 lack an antecedence basis. For examination purposes, the examiner considers this limitation "a pswap, a pfmul, and a pfpnacc instructions" as a parallel swap, a parallel floating-point multiply, and a parallel floating-point accumulation instructions.

Re claim 7, it is unclear by the limitations "pfsub, and pfadd instructions". For examination purposes, the examiner considers these limitations as a parallel floating-point subtraction and parallel floating-point addition instructions.

Claim 12 has the same problem as cited above.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2124

6. Claims 1, 4, 5, and 16-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Horton (U.S. 6,421,696).

Re claim 1, Horton discloses in Figure 3 and 8 a method of performing a discrete cosine transform "DCT" using a microprocessor having an instruction set that includes SIMD floating point instructions (abstract and col. 3 lines 24-30), wherein the method comprises: receiving a block of integer data having C columns and R rows (col. 1 lines 36-42 wherein the frame is a two dimensional data), wherein the block of integer data is indicative of a portion of an image (col. 1 lines 36-42); and for each row, loading the row data into registers (Figure 6); converting the row data into floating point form (col. 4 lines 60-65), wherein the registers each hold two floating point row data values ( $\{Re(0):Re(1)\}$ ,  $\{Re(2):Re(3)\}$ ,... in Figure 6); and performing a plurality of weighted-rotation operations on the values in the registers (Figure 10), wherein the weighted-rotation operations are performed using SIMD floating point instructions (col. 5 lines 1-6 and lines 28-34).

Re claim 4, Horton further discloses in Figure 10 for each row, altering the arrangement of values in the registers; performing a second plurality of weighted-rotation operations on the values in the registers; again altering the arrangement of the values in the registers; performing a third plurality of weighted-rotation operations on the values in the registers; yet again altering the arrangement of the values in the registers; and performing a fourth plurality of weighted-rotation operations on the values in the registers to obtain intermediate floating point values (depending on the number of input data, more stages are repeated as seen in Figure 10 and Figure 1).

Re claim 5, Horton further discloses in Figure 3 and 8 for each row, storing the intermediate floating point values to an intermediate buffer (Figure 6 and col. 6 lines 33-35).

Re claim 16, it is a system claim of claim 1. Thus, claim 16 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 17, it is a carrier medium claim of claim 1. Thus, claim 17 is also rejected under the same rationale in the rejection of rejected claim 1.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being obvious over Horton (U.S. 6,421,696), as applied to above claims, in view of Advanced Micro Devices Inc. ("AMD Extensions to the 3DNow!™ and MMX™ Instructions Sets Manual").

Re claim 2, Horton discloses in Figure 10 a DCT operation in floating point format. Horton does not disclose a converting is accomplished using the pi2fw instruction. However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the functionality of pi2fw instruction in multimedia operations. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the pi2fw instruction in the Advanced Micro Devices Inc.'s manual into Horton's

Art Unit: 2124

invention for converting packed integer to floating point words because it would enable to simplify the system software and improve the system performance.

Re claim 3, Horton discloses in Figure 10 weighted-rotation operations are accomplished using the swap operation, multiply operation (with weight), and accumulate operation in floating point format. Horton does not disclose weighted-rotation operations are accomplished using the pswap, pfmul, and pfpnacc instructions. However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the the pswap, pfmul, and pfpnacc instructions for used in the swap operation, multiply operation (with weight), and accumulate operation in floating point format. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the pswap, pfmul, pfpnacc instructions as seen in the Advanced Micro Devices Inc's manual into Horton's invention for performing the DCT operations because it would enable to simplify the system software and improve the system performance.

***Allowable Subject Matter***

9. Claims 6, 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. Claims 7 and 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
11. Claims 11 and 13-15 are allowed.

Art Unit: 2124

12. The following is an examiner's statement of reasons for allowance:

The prior art of records fails to disclose a method of performing a discrete cosine transform using a microprocessor having an instruction set that includes SIMD floating point instructions wherein the method comprising a step of receiving a block of data having C columns and R rows; and using two columns of data at a time for performing a plurality of weighted-rotation operations.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 5,815,421 to Dulong et al. disclose a method for transposing a two-dimensional array.
- b. U.S. Patent No. 6,141,673 to Thayer et al. disclose a microprocessor modified to perform inverse discrete cosine transform operations on a one-dimensional matrix of numbers within a minimal number of instructions.
- c. U.S. Patent No. 6,018,351 to Mennemeier et al. disclose a computer system performing a two-dimensional rotation of packed data representing multimedia information.



Art Unit: 2124

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Chat C. Do  
Examiner  
Art Unit 2124

July 28, 2003

*Kakali Chaki*  
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